Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method of generating transport overhead for a high-speed frame of data in a synchronous optical communications network, said high-speed frame of data including a plurality of low-speed frames of data, said method comprising:

receiving ~~at least one~~ an indication of error count associated with one of said low-speed frames of data, said indication of error count including a B1 count and a B2 count;

determining an error count bit pattern representative of said ~~at least one~~ indication of error count; and

inserting said error count bit pattern into a transport overhead for said high-speed frame, where said error count bit pattern is inserted in at least one portion of said transport overhead and where said at least one portion is unused according to a standard that defines said high-speed frame, wherein said standard that defines said high-speed frame is the SONET standard.

2. (canceled)

3. (canceled)

4. (canceled)

5. (Original) The method of claim 1 further comprising inserting a parity bit for said error count bit pattern into said transport overhead, where said parity bit is inserted in another portion of said transport overhead where said another portion is unused according to said standard that defines said high-speed frame.

6. (Original) The method of claim 1 further comprising: receiving an indication of synchronization status associated with one of said low-speed frames of data; determining a synchronization status bit pattern representative of said indication of synchronization status; and inserting said synchronization status bit pattern into said transport overhead for said high-speed frame, where said synchronization status bit pattern is inserted in at least one portion of said transport overhead and where said at least one portion is unused according to said standard that defines said high-speed frame.

7. (Original) The method of claim 1 further comprising: associating a channel identifier with each of said plurality of low-speed frames of data; determining a channel identification bit pattern representative of said channel identifier; and inserting said channel identification bit pattern into said transport overhead for said high-speed frame, where said channel identification bit pattern is inserted in at least one portion of said transport overhead and where said at least one portion is unused according to said standard that defines said high-speed frame.

8. (Currently Amended) A device for generating transport overhead for a high-speed frame of data in a synchronous optical communications network, said high-speed frame of data including a plurality of low-speed frames of data, said device comprising:

an error count bit pattern generator for: receiving ~~at least one~~ an indication of error count associated with one of said low-speed frames of data; and determining an error count bit pattern representative of said ~~at least one~~ indication of error count, said indication of error count including a B1 count and a B2 count; and

a line overhead inserter, in communication with said error count bit pattern generator, for inserting said error count bit pattern into a transport overhead for said high-speed frame, where said error count bit pattern is inserted in at least one portion of said transport overhead and where said at least one portion is unused according to a standard that defines said high-speed frame, wherein said standard that defines said high-speed frame is the SONET standard.

9. (Currently Amended) A device for generating transport overhead for a high-speed frame of data in a synchronous optical communications network, said high-speed frame of data including a plurality of low-speed frames of data, said device comprising:

means for receiving ~~at least one~~ an indication of error count associated with one of said low-speed frames of data, said indication of error count including a B1 count and a B2 count;

means for determining an error count bit pattern representative of said ~~at least one~~ indication of error count; and

means for inserting said error count bit pattern into a transport overhead for said high-speed frame, where said error count bit pattern is inserted in at least one portion of said transport overhead and where said at least one portion is unused according to a standard that defines said high-speed frame, wherein said standard that defines said high-speed frame is the SONET standard.

10. (Currently Amended) A method of processing transport overhead for a frame of data in a synchronous optical communications network in accordance with the SONET standard, said method comprising:

generating an error count including a B1 count and a B2 count by:

receiving a first low-speed frame;

calculating a first error monitoring set of bits based on said first frame;

receiving a second low-speed frame;

extracting a second error monitoring set of bits from a transport overhead of said second frame;

enumerating a number of differences between said first error monitoring set of bits and said second error monitoring set of bits as said error count; and

where a first performance of said generating gives an initial error count, repeating said generating to give at least one subsequent error count;

summing said initial error count and said at least one subsequent error count to give an accumulated error count; and

sending an indication of error count, based on said accumulated error count, to a device for generating transport overhead for a high-speed frame of data in a synchronous optical communications network, said high-speed frame of data including a plurality of low-speed frames of data including said first low-speed frame and said second low-speed frame.

11. (Currently Amended) A device for processing transport overhead for a frame of data in a synchronous optical communications network in accordance with the SONET standard, said device comprising:

an error monitor for generating an error count including a B1 count and a B2 count by:

receiving a first low-speed frame;

calculating a first error monitoring set of bits based on said first frame;

receiving a second low-speed frame;

extracting a second error monitoring set of bits from a transport overhead of said second frame;

enumerating a number of differences between said first error monitoring set of bits and said second error monitoring set of bits as said error count; and

where a first performance of said generating gives an initial error count, repeating said generating to give at least one subsequent error count;

a count accumulator for:

summing said initial error count and said at least one subsequent error count to give an accumulated error count; and

sending an indication of error count, based on said accumulated error count, to a device for generating transport overhead for a high-speed frame of data in a synchronous optical communications network, said high-speed frame of data including a plurality of low-speed frames of data including said first low-speed frame and said second low-speed frame.

12. (Currently Amended) A device for processing transport overhead for a frame of data in a synchronous optical communications network in accordance with the SONET standard, said device comprising:

means for generating an error count including a B1 count and a B2 count by:

receiving a first low-speed frame;

calculating a first error monitoring set of bits based on said first frame;

receiving a second low-speed frame;

extracting a second error monitoring set of bits from a transport overhead of said second frame;

enumerating a number of differences between said first error monitoring set of bits and said second error monitoring set of bits as said error count; and

where a first performance of said generating gives an initial error count, means for repeating said generating to give at least one subsequent error count;

means for summing said initial error count and said at least one subsequent error count to give an accumulated error count; and

means for sending an indication of error count, based on said accumulated error count, to a device for generating transport overhead for a high-speed frame of data in a synchronous optical communications network, said high-speed frame of data including a plurality of low-speed frames of data including said first low-speed frame and said second low-speed frame.

13. (Currently Amended) A method of combining a plurality of low-speed frames of data into a high-speed frame of data such that error monitoring counts are transparently transferred to a receiving network element, said method comprising:

receiving a set of low-speed frames on each of a plurality of channels;

generating an accumulated error count using a B1 count and a B2 count for each channel from a received set of said plurality of low-speed frames on said each channel;

determining an error count bit pattern for said each channel based on said accumulated error count for each channel; and

inserting said error count bit pattern into a transport overhead for said high-speed frame, where said one said error count bit pattern is inserted in at least one portion of said transport overhead and where said at least one portion is unused according to a standard that defines said high-speed frame, wherein said standard that defines said high-speed frame is the SONET standard.

14. (Currently Amended) A combiner for combining a plurality of low-speed frames of data into a high-speed frame of data such that error monitoring counts are transparently transferred to a receiving network element, said combiner comprising:

for each of a plurality of channels, a low-speed transport overhead processor for:

receiving a set of low-speed frames; and

generating an accumulated error count using a B1 count and a B2 count from said received set; and

a high-speed transport overhead generator, in communication with each said low-speed transport overhead processor for:

determining an error count bit pattern for said each channel based on said accumulated error count for each channel; and

inserting said error count bit pattern into a transport overhead for said high-speed frame, where said one said error count bit pattern is inserted in at least one portion of said transport overhead and where said at least one portion is unused according to a standard that defines said high-speed frame, wherein said standard that defines said high-speed frame is the SONET standard.

15. (Currently Amended) A combiner for combining a plurality of low-speed frames of data into a high-speed frame of data such that error monitoring counts are transparently transferred to a receiving network element, said combiner comprising:

means for receiving a set of low-speed frames on each of a plurality of channels;

means for generating an accumulated error count using a B1 count and a B2 count for each channel from a received set of said plurality of low-speed frames on said each channel;

means for determining an error count bit pattern for said each channel based on said accumulated error count for each channel; and

means for inserting said error count bit pattern into a transport overhead for said high-speed frame, where said one said error count bit pattern is inserted in at least one portion of said transport overhead and where said at least one portion is unused according to a standard that defines said high-speed frame, wherein said standard that defines said high-speed frame is the SONET standard.

16. (Currently Amended) A method of processing transport overhead for a frame of data in a synchronous optical communications network, said method comprising:

receiving said frame of data;

extracting, from a transport overhead of said frame of data, an error count bit pattern including a B1 count and a B2 count, where said error count bit pattern is extracted from at least one portion of said transport overhead and where said at least

one portion is unused according to a standard that defines said frame, wherein said standard that defines said high-speed frame is the SONET standard;

determining an error count quantity from said error count bit pattern; and

indicating said error count quantity to an appropriate one of a plurality of transport overhead generators.

17. (Canceled)

18. (Currently Amended) The method of ~~claim 17~~ claim 16 wherein said at least one portion of said transport overhead comprises at least one Z1 byte.

19. (Original) The method of claim 16 wherein said determining comprises dividing a value represented by said error count bit pattern by a pre-determined integer value.

20. (Currently Amended) A device for processing transport overhead for a frame of data in a synchronous optical communications network, said device comprising:

a channel information monitor for:

receiving said frame of data;

extracting, from a transport overhead of said frame of data, an error count bit pattern including a B1 count and a B2 count, where said error count bit pattern is extracted from at least one portion of said transport overhead and where said at least one portion is unused according to a standard that defines said frame, wherein said standard that defines said high-speed frame is the SONET standard;

determining an error count quantity from said error count bit pattern; and

indicating said error count quantity to an appropriate one of a plurality of transport overhead generators.

21. (Currently Amended) A device for processing transport overhead for a frame of data in a synchronous optical communications network, said device comprising:

means for receiving said frame of data;

means for extracting, from a transport overhead of said frame of data, an error count bit pattern including a B1 count and a B2 count, where said error count bit pattern is extracted from at least one portion of said transport overhead and where

said at least one portion is unused according to a standard that defines said frame, wherein said standard that defines said high-speed frame is the SONET standard;

means for determining an error count quantity from said error count bit pattern; and

means for indicating said error count quantity to an appropriate one of a plurality of transport overhead generators.

22. (Currently Amended) A method of generating transport overhead for a low-speed frame of data in a synchronous optical communications network, said low-speed frame of data received as part of a high-speed frame of data, said method comprising:

receiving at least one error count quantity associated with said low-speed frame of data, where said at least one error count quantity is determined from an error count bit pattern including a B1 count and a B2 count extracted from said high-speed frame of data;

determining a standard error monitoring set of bits based on a previous low-speed frame of data;

creating an altered error monitoring set of bits that differs from said standard error monitoring set of bits in a number of bit positions equivalent to said error count quantity; and

inserting said altered error monitoring set of bits into a transport overhead for said frame, where said altered error monitoring set of bits is inserted in a location normally occupied by said error monitoring set of bits according to a standard that defines said frame, wherein said standard that defines said high-speed frame is the SONET standard.

23. (Original) The method of claim 22 further comprising:

receiving an indication of a quantity of errors associated with said high-speed frame; and

where said determining said error count quantity is further based on said indication of said quantity of errors associated with said high-speed frame.

24. (Currently Amended) A device for generating transport overhead for a frame of data in a synchronous optical communications network, said device comprising:

a count processor for receiving ~~at least one~~ an error count quantity associated with a B1 count and a B2 count of said frame of data;

an error count generator, in communication with said count processor, for:

determining a standard error monitoring set of bits based on a previous frame of data;

receiving said error count quantity from said count processor;

creating an altered error monitoring set of bits that differs from said standard error monitoring set of bits in a number of bit positions equivalent to said error count quantity; and

an overhead inserting device, in communication with said error count generator, for inserting said altered error monitoring set of bits into a transport overhead for said frame, where said altered error monitoring set of bits is inserted in a location normally occupied by said standard error monitoring set of bits according to a standard that defines said frame, wherein said standard that defines said high-speed frame is the SONET standard.

25. (Currently Amended) A device for generating transport overhead for a frame of data in a synchronous optical communications network, said device comprising:

means for receiving at least one error count quantity associated with said low-speed frame of data, where said at least one error count quantity is determined from an error count bit pattern including a B1 count and a B2 count extracted from said high-speed frame of data;

means for determining a standard error monitoring set of bits based on a previous low-speed frame of data;

means for creating an altered error monitoring set of bits that differs from said standard error monitoring set of bits in a number of bit positions equivalent to said error count quantity; and

means for inserting said altered error monitoring set of bits into a transport overhead for said frame, where said altered error monitoring set of bits is inserted in a location normally occupied by said error monitoring set of bits according to a standard

that defines said frame, wherein said standard that defines said high-speed frame is the SONET standard.

26. (Currently Amended) A method of de-multiplexing a plurality of low-speed frames of data from a high-speed frame of data, said method comprising:

receiving said high-speed frame;

extracting an error count bit pattern including a B1 count and a B2 count from said high-speed frame;

determining an error count quantity based on said error count bit pattern;

determining a standard error monitoring set of bits for a low-speed frame;

creating an altered error monitoring set of bits that differs from said standard error monitoring set of bits in a number of bit positions equivalent to said error count quantity; and

inserting said altered error monitoring set of bits into a transport overhead for said low-speed frame, where said altered error monitoring set of bits is inserted in a location normally occupied by said standard error monitoring set of bits according to a standard that defines said low-speed frame, wherein said standard that defines said high-speed frame is the SONET standard.

27. (Original) The method of claim 26 further comprising:

determining a quantity of errors associated with said high-speed frame; and

where said determining said error count quantity is further based on said quantity of errors associated with said high-speed frame.

28. (Currently Amended) A device for de-multiplexing a plurality of low-speed frames of data from a high-speed frame of data, said device comprising:

a high-speed transport overhead processor for:

receiving said high-speed frame;

extracting an error count bit pattern including a B1 count and a B2 count from said high-speed frame;

determining an error count quantity based on said error count bit pattern;

a low-speed transport overhead generator, in communication with said high-speed transport overhead processor, for:

determining a standard error monitoring set of bits for a low-speed frame;

creating an altered error monitoring set of bits that differs from said standard error monitoring set of bits in a number of bit positions equivalent to said error count quantity; and

inserting said altered error monitoring set of bits into a transport overhead for said low-speed frame, where said altered error monitoring set of bits is inserted in a location normally occupied by said standard error monitoring set of bits according to a standard that defines said low-speed frame, wherein said standard that defines said high-speed frame is the SONET standard.

29. (Currently Amended) A device for de-multiplexing a plurality of low-speed frames of data from a high-speed frame of data, said device comprising:

means for receiving said high-speed frame;

means for extracting an error count bit pattern including a B1 count and a B2 count from said high-speed frame;

means for determining an error count quantity based on said error count bit pattern;

means for determining a standard error monitoring set of bits for a low-speed frame;

means for creating an altered error monitoring set of bits that differs from said standard error monitoring set of bits in a number of bit positions equivalent to said error count quantity; and

means for inserting said altered error monitoring set of bits into a transport overhead for said low-speed frame, where said altered error monitoring set of bits is inserted in a location normally occupied by said standard error monitoring set of bits according to a standard that defines said low-speed frame, wherein said standard that defines said high-speed frame is the SONET standard.

30. (Currently Amended) A communication system for transporting a plurality of channels of low-speed frames of data on a single channel of high-speed frames of data, said system comprising:

a combiner for combining said low-speed frames of data into a high-speed frame of data including:

for each of a plurality of channels, a low-speed transport overhead processor for:

receiving a set of low-speed frames; and

generating an accumulated error count from said received set;

a high-speed transport overhead generator, in communication with each said low-speed transport overhead processor for:

determining an error count bit pattern including a B1 count and a B2 count for said each channel based on said accumulated error count for each channel; and

inserting at least one said error count bit pattern into a transport overhead for said high-speed frame, where said one said error count bit pattern is inserted in at least one portion of said transport overhead and where said at least one portion is unused according to a standard that defines said high-speed frame, wherein said standard that defines said high-speed frame is the SONET standard; and

a device for de-multiplexing said plurality of low-speed frames of data from said high-speed frame of data including:

a high-speed transport overhead processor for:

receiving said high-speed frame;

extracting said error count bit pattern from said high-speed frame;

determining an error count quantity based on said error count bit pattern;

a low-speed transport overhead generator, in communication with said high-speed transport overhead processor, for:

determining a standard error monitoring set of bits for a low-speed frame;

creating an altered error monitoring set of bits that differs from said standard error monitoring set of bits in a number of bit positions equivalent to said error count quantity; and

inserting said altered error monitoring set of bits into a transport overhead for said low-speed frame, where said altered error monitoring

set of bits is inserted in a location normally occupied by said standard error monitoring set of bits according to a said standard that defines said low-speed frame.

31. (canceled)

32. (New) The method of claim 1 wherein said at least one portion of said transport overhead comprises at least one Z1 byte.

33. (New) The method of claim 1 wherein said at least one portion of said transport overhead comprises at least one S1 byte.